Oroville Facilities Re-Licensing

Proposed Computer Modeling Scheme

Purpose of Computer Modeling

- Estimate system response to changes

- Done for two reasons
  - Evaluate impacts of new facilities before they are built
  - Evaluate impacts of new operational policy before it is imposed

General Modeling Limitations

- Models are simply an estimate
- Modeling tools are not models
- Models are only as good as the input data
- Models may be very precisely wrong
- Models simulate response to assumptions does not predict actual operation

Analysis of Model Results

- Perform impact analysis on comparison not on absolute results. Done by:
  - Set a system “baseline” operation or model simulation
  - Impose changes on system and repeat modeling
  - Compare two model simulations

Oroville Facilities Relicensing Modeling

- Will not be a single model
- Data will need to be “translated” between models
- Users must be aware of limits of each model used in the process
- Models will not answer all questions

Statewide Operations Modeling

- Oroville operates for water supply as part of State Water Project (SWP)
  - Operates to meet statewide operational constraints
  - Requires both multi year and annual operational constraints
  - Requires co-ordination with USBR Central Valley Project (CVP)

Statewide Operation Modeling

- Will use CALSIM II model when complete
- Planning type model, not real time model
- Uses monthly time step for a 74 year period of record
- Uses a constant “level of development”
- Results used to set boundary conditions for local operation modeling

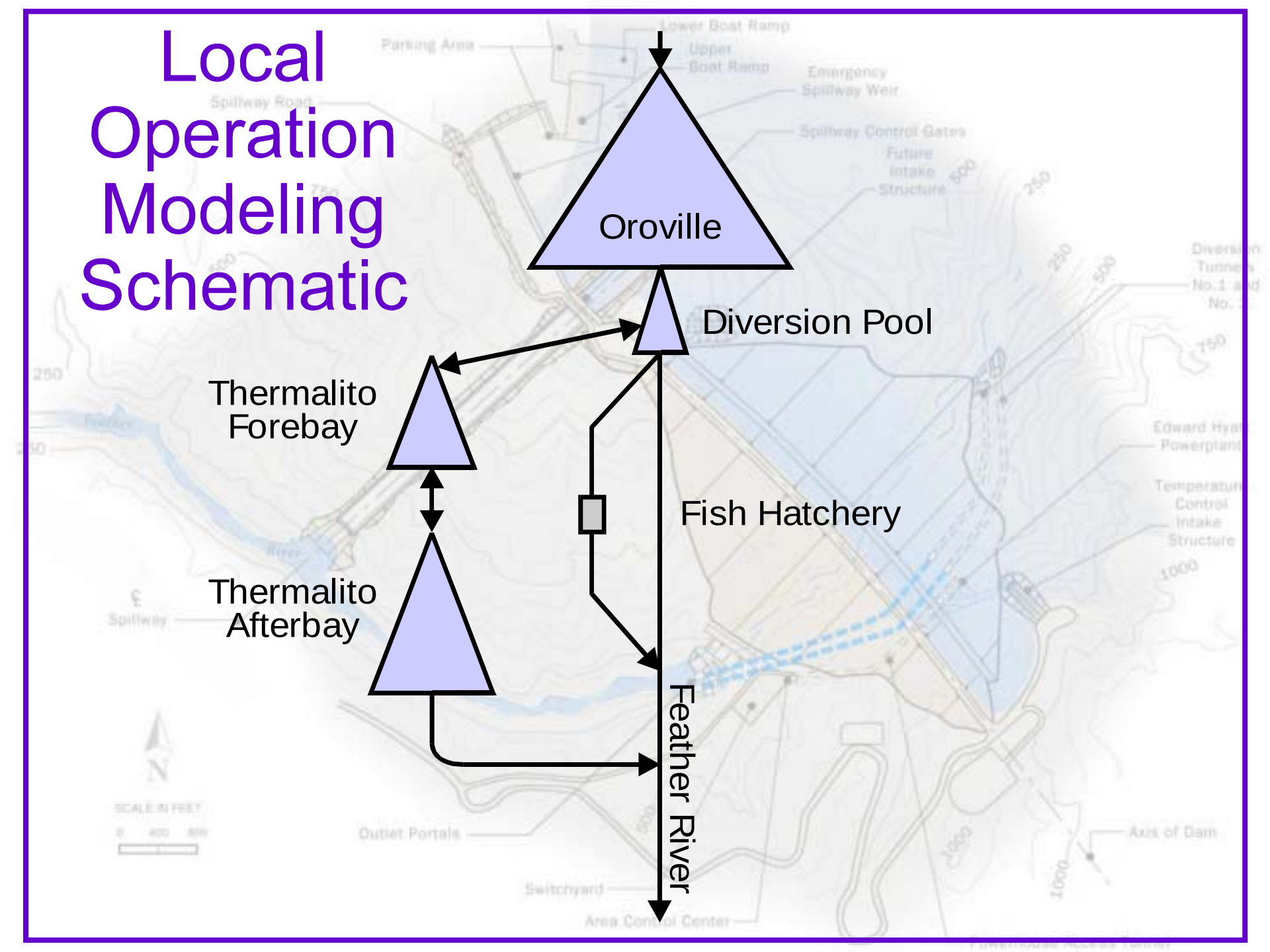
CALSIM-II JOINT SCHEMATIC

July 19, 2001

Local Operation Modeling

- Use results of statewide modeling as boundary conditions
- Hourly time step
- Operate to optimize power production within water supply limits and detailed operation limits on weekly basis
- Requires a 3 reservoir system with 2 levels of pumpback operation

Local Operation Modeling Schematic



Oroville Reservoir Temperature Modeling

Used to estimate effects on cold water pool.

- Release temperature
- Pump back impacts on temperatures in reservoir

- Spatial complexity to be determined
- Probable daily timestep

Thermalito Complex Temperature Model

- Use flow data from local operations modeling
- Extremely complex system for temperature
- Not concerned with temperature within the system, only with temperature at boundary of the system
- May be able to simplify this to a statistical relationship instead of explicit numerical model

Feather River Temperature Model

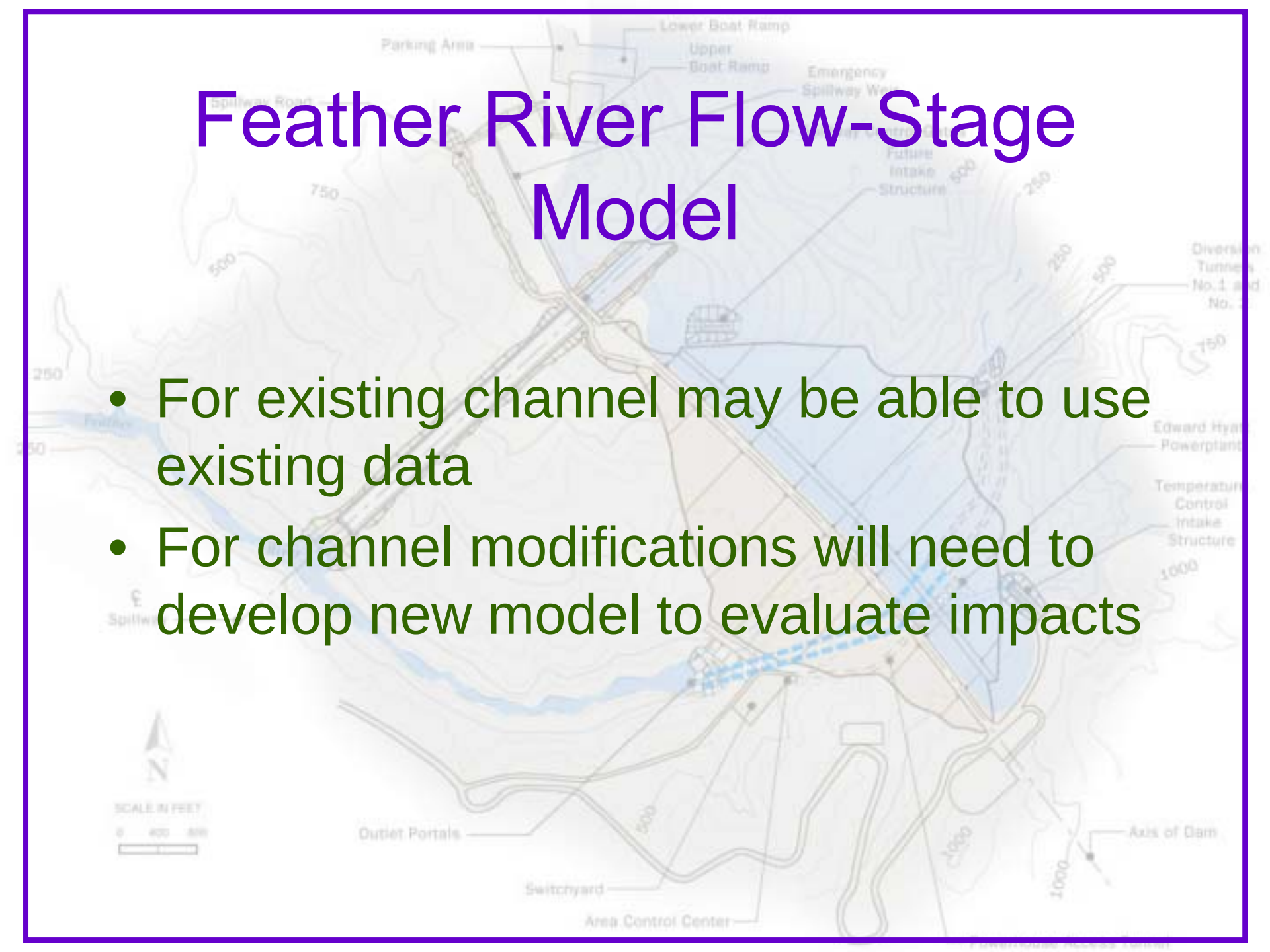
- Use flow data from local operation modeling
- Estimate temperatures in the Feather River
- Possible hourly timestep
- Need to investigate how far downstream Oroville can reasonably control river temperature

Feather River Sediment Transport Analysis

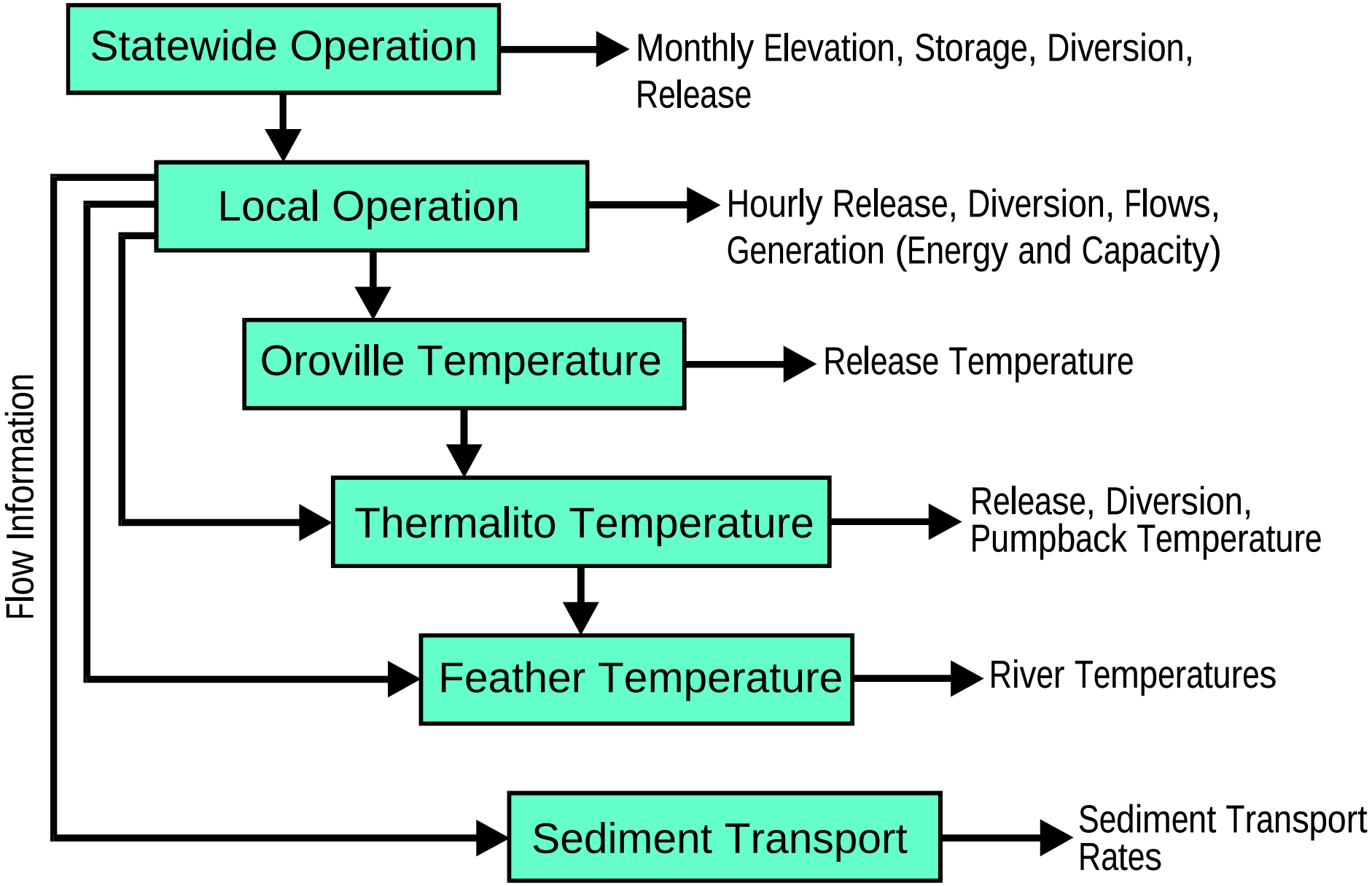
- Estimate of sediment transport in the Feather River
- Use flow data from local operations model with geomorphology data to estimate sediment transport and deposition at various locations

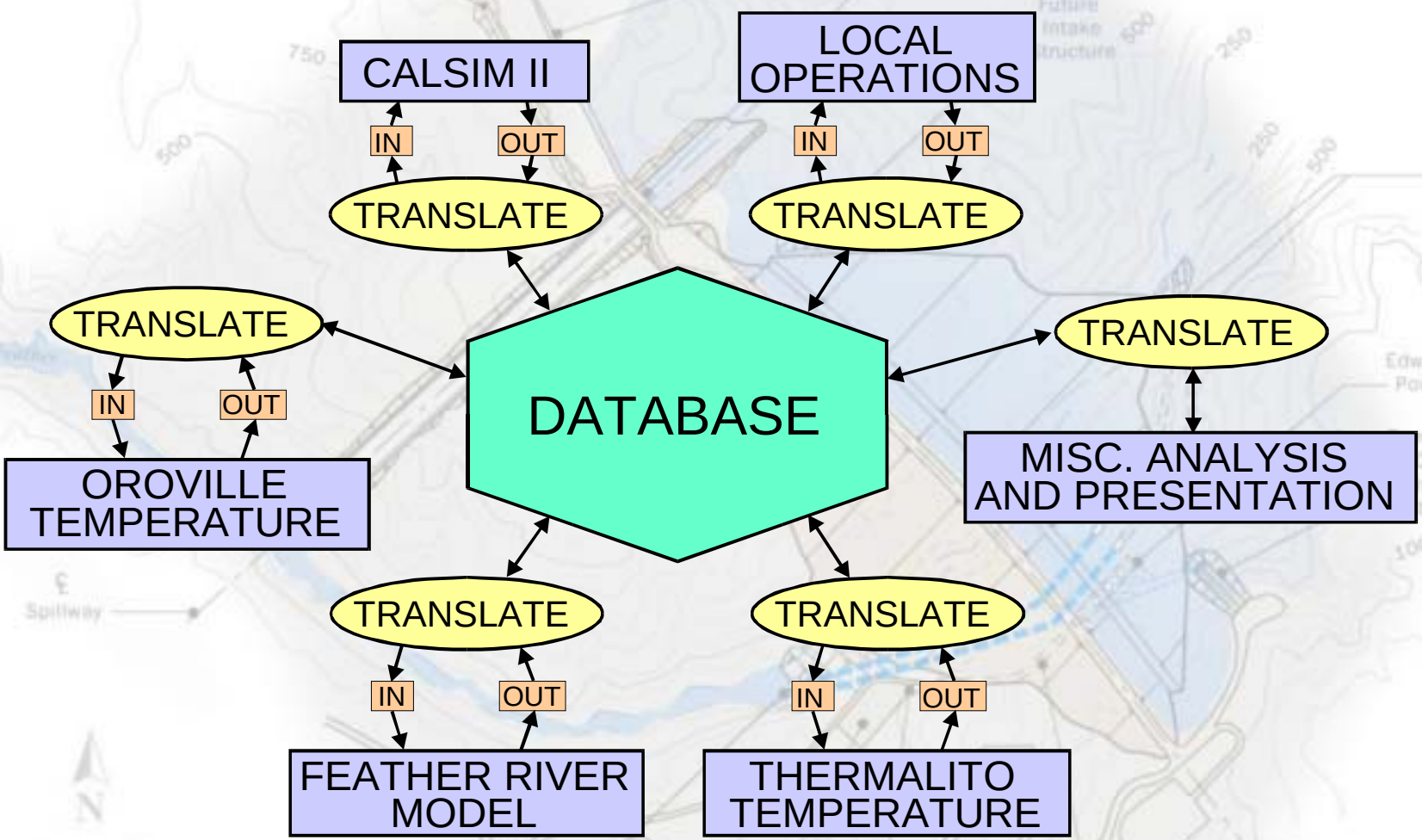
Feather River Flow-Stage Model

- For existing channel may be able to use existing data
- For channel modifications will need to develop new model to evaluate impacts



MODELING SCHEME




CALSIM II
IN
OUT
TRANSLATE
LOCAL OPERATIONS
IN
OUT
TRANSLATE
TRANSLATE
IN
OUT
OROVILLE TEMPERATURE
DATABASE
TRANSLATE
MISC. ANALYSIS AND PRESENTATION
TRANSLATE
IN
OUT
FEATHER RIVER MODEL
TRANSLATE
IN
OUT
THERMALITO TEMPERATURE

Modeling Status

- Investigating modeling results needed for analysis, both type of data and accuracy of data
- Investigating existing data
- Investigating types of modeling tool available
- Developing detailed model tool selection, and data and model development work plan